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~~N.R.C.~~

~~NATIONAL RESEARCH CORPORATION~~

~~70 MEMORIAL DRIVE~~

~~CAMBRIDGE 42, MASSACHUSETTS~~

CABLE ADDRESS - NARESCO

H. C. WEINGARTNER
VICE PRESIDENT
EQUIPMENT DIVISION

June 10, 1952

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AIR MAIL

Manager of Operations
U. S. Atomic Energy Commission
P. O. Box 30, Ansonia Station
New York 23, New York

Attention: Mr. S. H. Brown

Gentlemen: Re: A.E.C. Contract No. AT(30-1)-1270

Please refer to your letter of May 26, 1952, Subject: Required Capacity of Thorium Vacuum Furnaces.

We assume the weight of the 9-1/2" biscuits will be 107 pounds approximately; i.e. 100 pounds of thorium per biscuit. A four biscuit charge is not feasible because of crucible dimensions, availability, etc. A three biscuit charge will, when molten, fill the proposed crucible half full. This condition is undesirable because, due to the low heat of fusion of thorium and the lower temperature of the crucible walls above the melt, there is danger of a skull formation during pouring.

Therefore it is proposed to add scrap to bring the molten level to about two thirds of the crucible height; i.e. add 72 pounds approximately of scrap. This level is considered to be just about right. Therefore, a scrap loading mechanism is an integral (not optional) part of the design. The ingot size will be 5 inch diameter and 46 inches long approximately before cropping.

It is estimated that the total cycle for a run containing zinc will be 12 hours, while the cycle for a run containing scrap only will be 11 hours. This permits a maximum of two cycles per day per furnace, or four cycles total.

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K.W. Walker DATE 9/4/50
sed Davis
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ORO 65527
OCT 20 1952

The following run schedule will indicate the capacity:

	Run No.	Virgin (lbs.)	Turnings (lbs.)	Croppings (lbs.)
Monday	1	300	72	
Monday	2	300	72	
Tuesday	3		60	306
Tuesday	4	300	72	
Tuesday	5	300	72	
	6 repeat			

Total 1854 lbs. in two days

927 lbs. per day -

average 2-1/2 runs per day

From the above it is clear to see that the capacities mentioned in your letter of May 26, 1952 can be hit.

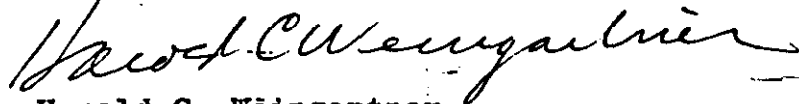
The maximum capacity on the basis of the above feed distribution for a five day week will comprise twenty runs, four of which are 366 lbs. scrap runs and sixteen of which are 372 lbs. virgin plus scrap runs. This gives a five day week total of 7416 lbs., or a daily average of 1483 lbs.

Please note: This maximum is just what it says. No stream factor or provision for down time (i.e. repairs, etc.) has been applied.

To get 1541 lbs./day you could run more than five days per week. (Do not exceed seven.) Or, depending upon the determination, by experience, of the proper factors for down time etc., you may have to add another furnace.

I wish further to confirm that there exist several items of design which have not been completely established in our experimental runs, due to the limitations of our equipment. It is our opinion that these items may require modification at Fernald, but that design and fabrication should not be held up pending experimental verification here. It is anticipated that the scope of the design will allow the modifications to be expeditiously made.

Very truly yours,



Harold C. Weingartner

HCW:pb

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